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ABSTRACT

This report summarizes research related to the use of a conventional basal reading program with students in the Kamehameha Early Education Program (KEEP). Results of instruction were measured by the number of objectives gained each quarter, the total number of objectives gained, the number of lessons taken for each objective, and scores on the Gates-MacGinitie Reading Test, which was also given to three comparison groups. KEEP students learned many objectives, but at a relatively slow rate. On the Gates-MacGinitie, first graders scored 1.4 rather than the expected 1.9. Measures of student motivation indicated that motivation was high throughout the year, but this was not enough to raise students to grade level. Rate of learning increased over the year; statistics on initial consonant learning indicated a learning-to-learn phenomenon rather than phonological interference. The results were interpreted as pointing to specific areas of further research: attention skills, training in language and cognitive skills to precede and accelerate reading achievement, and ways of teaching initial consonants. (Author/AA)

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KEEP Reading Research and Instruction:

Results of the 1973 - 74 Program

Technical Report #26

of

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The Kamehameha Early Education Program

The Kamehameha Early Education Program (KEEP) is a research and development program of The Kamehameha Schools/Bernice P. Bishop Estate. The mission of KEEP is the development, demonstration, and dissemination of methods for improving the education of Hawaiian and Part-Hawaiian children. These activities are conducted at the Ka Na'i Pono Research and Demonstration School, and in public classrooms in cooperation with the State Department of Education. KEEP projects and activities involve many aspects of the educational process, including teacher training, curriculum development, and child motivation, language, and cognition. More detailed descriptions of KEEP's history and operations are presented in Technical Reports #1-4.

Technical Report #26

KEEP Reading Research and Instruction:

Results of the 1973 - 74 Program

Kathryn H. Au Gisela E. Speidel

During this first phase of KEEP reading research, the basic plan was to hold curriculum effects constant by following the instructional plan outlined in a conventional basal reader program, and to maintain students' motivation at high levels. The idea was to do exactly what an ordinary public school might do, but 1) monitor the acquisition of skills by each child; and 2) maintain good behavioral management by the teachers in order to maintain high student motivation.

Assuming that motivation could be maintained at high levels, this strategy would enable us to make decisions regarding the direction of future research. If the students were close to grade level reading by the end of the year, this finding would show the adequacy of a conventional curriculum when combined with good teaching and motivation. Near grade level reading results would suggest the utility of more work in the areas of teaching and motivation, rather than curriculum, for researchers interested in improving reading skills in this population of children.[1] On the other hand, if the students did not attain an acceptable level of reading skill by the end of the year with the

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[1]Seventy-five percent of the children come from families receiving welfare assistance, while the other twenty-five percent are from upwardly mobile families. Eighty percent of the children are part-Hawaiian. In the first grade class, there are 12 boys and 16 girls, in the kindergarten, 14 boys and 13 girls.

methods used, this finding would indicate a need for further research on curriculum variables. These would include determining the specific reading skills to be taught, the order in which these skills should be taught, the relative importance of different skills, etc. It might also indicate the desirability of certain types of language training which would precede formal reading instruction.

In addition, by recording the number of instruction sessions that a child required to master a reading objective, it would be possible to test ideas concerning curriculum variables. One idea to be tested was whether skills in some areas would be learned more slowly than others. If areas of difficulty could be isolated, it would be possible later to research ways of teaching skills in those areas more effectively, and thus help accelerate the whole procers of learning to read. A second idea to be examined was based on an observation made by the teachers that students seemed to "forget" what they had apparently learned a short time before. To test this idea, retention tests were given.

Reading Groups and Classroom Organization

During the first half of the school year, the formal reading program involved the one class of 28 first graders only (KEEP's Class I). There were four reading groups, ranging in size from four to nine children. The students were originally placed in groups according to the reading objectives in which they needed instruction, as determined by criterion-referenced test results. The composition of the groups changed from time to time, depending on the skills different children were ready to learn (based on the results of weekly testing). The reading teacher met with each group for approximately 20 minutes each morning. The students spent the rest of the time doing seatwork -- not necessarily related to reading -- and were monitored by another

teacher.

At the beginning of the second semester, the first grade and kindergarten classes were combined, and the 55 children were organized into six reading groups. Students were assigned to groups according to their performance on criterion-referenced tests. All but one of the groups contained both kindergarten and first grade students and the groups ranged in size from four to eleven students. One group of eight kindergarten children, all of whom had scores of zero on the reading pretest, were put into a special prereading program and were not taught according to the basal reader program. (See Technical Report #34 for a description of this program.) Two teachers worked with the reading groups while one teacher supervised the other children who did seatwork when not in a reading class. Reading teachers met with each group twice in a morning for about 20 minutes, for a total of approximately 40 minutes a day.

Teaching

The two reading teachers had been trained in the use of positive reinforcement, and had an adequate understanding of behavioral principles. Both teachers tried to give as much positive reinforcement as possible to the students. Reinforcement was given contingently, either for a correct response on an academic task or for proper attentional behavior.

Teacher 1 was observed during the first semester, and Teachers 1 and 2 during the second semester. Teacher behaviors in the reading classes were monitored for approximately 15 minutes each morning. Times of observation varied according to days of the week. The following code was used to record teacher behavior:

A Academic praise ("good work", "perfect", "nice writing", etc.

M Management praise (e. g, "I like the way you are sitting.")

B+ Positive body contact (hugging, patting, squeezing)

T+ Giving of tokens (checks, stars, letters, i.e., any material reinforcement or object rewarding good work)

P+ Giving of privilege, any nonmaterial reinforcer, such as going out to recess first or standing in line first

H+ Positive hand gestures (e. g. thumbs up, applause)

S Scold, for either academic or management misbehavior, condemnation of that behavior in an angry tone, without judging child to be personally bad

NE Negative evaluation of child without a scolding tone

SE Negative evaluation included in scold

D A desist, any command for child to cease inappropriate behavior

B- Negative body contact, pulling child away from something, pushing him toward something, shakes, etc. that are not painful (When circled, it indicates painful negative body contact.)

T- Removal of tokens

H- Negative hand gestures (e. g. hand to lips)

O Taking object away from child

R Sending child to time out

A report on relative frequencies of teacher behavior will be presented in a forthcoming Technical Report.

Motivation

Since observations in the regular classroom and reports from teachers suggested that learning to read may not be motivating for these children, a

motivational plan was devised to pair reading achievement with known reinforcers in the hope that reading achievement would itself become a reinforcer. The system used centered around a "reading party" which was held every Friday afternoon.

During every class, students were given the opportunity to earn a "star," and the student or students in each reading group who earned the most stars during the week received an elaborate written invitation to the reading party. Stars were generally given to the students who gave the largest number of correct academic responses during a lesson. On days when tests were given, stars were awarded on the basis of test scores.

All children in the class eventually attended the reading party. The teachers were sensitive to individual differences, and equalized the opportunity for all to go to the reading party by giving easier tasks to some children and harder tasks to others within the same group. The teachers attempted to reward children who were showing exceptional effort, even if these efforts did not bring them to the same level of achievement as others in the group.

The reading party was conducted by one of the reading teachers, and, sometimes, other adults working in the school were asked to attend. At the reading party, the children usually were given easy-to-read books which they would then read aloud together, and they were given either cookies or candy to eat. Other activities included singing, games, and the telling of riddles.

All adults working in the school knew about the reading party, and children who received invitations to it were always given much social reinforcement. Parents were also kept informed, not only because the children proudly took their invitations to the reading party home, but because the names of children attending the weekly reading parties were published in

the school's weekly newsletters.

Working from the assumption that good motivation would manifest itself in a high level of attentiveness during reading classes, motivation was measured by recording the level of student attention. If the students were well motivated, they should pay attention to the teacher and remain "on-task" a high percentage of the time.

The students' behavior in the reading classes was recorded by using a sweep technique. The observer went down a list of the students' names and noted whether each was on-task (paying attention), off-task (not paying attention), or disruptive (not paying attention and bothering other students or the teacher). Observations of each teacher's reading classes were generally made five times a week, at varying times in the morning.

Curriculum

The basal reader program selected for use was the Ginn 360, by far the most widely used basal series in the state. The series is divided into levels which are not supposed to correspond to grade levels. A first grade student might complete levels 1 through 5 and a second grade student, levels 5 through 8, but no absolute standards are set by the program. A brief description of the main types of objectives covered in each of the first five levels follows.

Level 1 (39 objectives): The first few objectives have to do with identifying and naming the letters of the alphabet from a to j. Discrimination of similar letters, such as u and n, d and p, follows. The remaining objectives concern the development of the student's ability to identify and discriminate words that begin with twenty different initial consonant sounds.

Level 2 (26 objectives): The aim in level two is to build the student's

sight vocabulary and, for this purpose, 30 new words are introduced.

Level 3 (52 objectives): Some objectives concern the discrimination of similar phonemes, such as k and g, p, t, and d in initial and final position. Thirty-six new sight words are to be taught. Vowel sounds i and ay are introduced and a variety of graphemic bases, -ill, -it, and -ipe and others, are to be learned.

Level 4 (35 objectives): There is a great deal of emphasis in level four on decoding words ending with specified graphemic bases, such as -eed, -eek, and -eep. Discrimination of similar phonemes in initial, medial, and final positions is also stressed and 38 sight words are introduced.

Level 5 (82 objectives): More vowel sounds are taught and discrimination between vowel sounds is emphasized. Clusters such as pl and tr and digraphs th and sh are introduced, along with verb endings -ing and -ed, the possessive form 's, and contractions. Many new sight words, 112 in all, are also to be learned in level five, in addition to several new graphemic bases.

Measuring Student Achievement

A list of behavioral objectives was drawn up for the first six levels of the Ginn 360 series, in the exact order in which the program recommends they be taught. Objectives were precise and limited. At the preprimer level, for example, "Can identify and name the letters A, a" is one objective while "Can identify and name the letters B, b" is another. Objectives were also designed to be of equal difficulty. This meant that earlier objectives might include fewer items than similar, later objectives. For example, in level 2, each objective consisted of only one or two sight words, while in level 5 each objective contained an average of four words.

The aim of the criterion-referenced testing was to chart student's mastery of specific skills as they were learned. Pre- and posttests were

designed for each objective, with the regular form of each test consisting of eight items. Short forms of the same tests, for use as level pretests and retention tests, consisted of four items each. Criterion for mastery of each objective was correct answers on all eight or four items. Almost all tests were multiple choice with the student being asked to circle or mark the correct answer.

These criterion-referenced tests were administered in the following ways:

1. At the beginning of the year, before reading instruction began, the students were given pretests covering all objectives in level one.

2. Before students entered each new level, they were given pretests on all the objectives in that level.

3. Tests were also administered each Monday to cover the objectives which had been taught during the previous week. Generally, students had to pass the test before moving on to the next objective.

4. Two weeks after students had completed work in a level, they were given retention tests to see if they remembered the skills they had learned.

In addition, teachers kept notes on which objectives were covered in class each day, and the dates each child was taught a given objective were recorded. Individual reading records kept for each student thus showed: 1) the date of pretesting for a given objective; 2) the dates of instruction on that objective; 3) the date the student passed the posttest; and 4) retention data.

Standardized test results provided another means of measuring student progress in reading. The Gates-MacGinitie Reading Test, Primary A, with sections covering vocabulary and comprehension, was administered at the end of the year. In addition to the KEEP first grade class, the test was

also given to first graders at a middle class suburban school, at an urban school in a disadvantaged area, and at a Neighbor Island school in a rural, largely Hawaiian community.

Results

Initial Pretests

Pretests given to the first graders during the first week of school showed that few reading skills had been mastered at the time. In the level one pretest, which contained 39 subtests, each representing an objective, the total number of subtests passed ranged from 0 to 12, with the mean number correct for the class being 6.39 (n=23).[2] None of the children had mastered any initial consonant sounds; most were able to identify the first few letters of the alphabet and to discriminate between similar letters, such as p and q.

The same test was administered to the kindergarten class at the beginning of the second semester, just prior to their entry into the formal reading program. Scores ranged from 0 to 29, with a mean of 8.22 (n=27). At the upper end of the scores, four children had mastered most of the initial consonant sounds, while at the other extreme, eight children scored 0. The rest of the class could identify some letters and make some of the letter discriminations.

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[2]The results reported below were computed specifically for the purpose of the basal reader study, and it will be noticed that the number of subjects (n), whose test results were used in the analyses in different sections, varies. The reasons for including or excluding the data for certain children from any particular analysis are as follows. For the first grade, the initial pretest data were based on an n of 23. Data were not included for the five first grade children who had not attended KEEP during the previous year and who were admitted after the basal reader program began. Because they had received training in other programs, these children had many skills different from those of the other KEEP students. One of the children was admitted

Total number of objectives gained

Gain scores were computed by subtracting the original pretest scores from the total number of posttests passed by the end of the year. For the first grade class, the mean number of objectives gained was 91.96 (n=23). All but five children in the class were close to completing level three, which meant that most had a sight vocabulary of more than 66 words, could discriminate between most single initial consonants as well as final consonants, and could decode one syllable words ending with a number of different graphemic bases. The range for the total number of objectives learned, including those passed on the original pretest, was from 15 to 223, with a mean of 98.35 (n=23), based again on the number of posttests passed by the end of the school year.

During the second semester, the mean number of objectives gained for the kindergarten class was 23.85 (n=27) and 33.47 (n=19) without the students in the special program. Of the kindergarten students who completed level one, six were working on level two, while four were close to completing level three. The mean total of objectives learned, including those passed on the pretest, was 32.07 (n=27) for the whole class. Excluding the students in the special program, the mean was 45.16 (n=19).

Total number of objectives gained per quarter

The number of posttests passed during each quarter of the school year

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early in the first quarter, and data for this child is included in certain analyses where it seemed appropriate to do so, such as in the analysis of objectives gained per quarter. Correlations and other analyses which involve only end of the year data for the first grade were computed using data for all of the children (n=28). In the kindergarten class, one child was admitted after the end of the first quarter. Therefore, beginning of the school year analyses have an n of 26, while the full n of 27 was used for end of the year analyses. The factors mentioned above may be relevant in other studies. Therefore, later technical reports may present slightly different statistics from those reported here.

was computed for the first graders. The mean number of objectives gained per quarter are listed below:

Table 1

Objectives Gained Per Quarter

First Quarter	10.18
Second Quarter	19.54
Third Quarter	31.71
Fourth Quarter	33.17

(n=24)

A significant increase in the number of objectives gained occurred between the first and second quarters ($\underline{A}$=.0824, $p<.001$), and between the second and third quarters ($\underline{A}$=.0905, $p<.001$). During the fourth quarter, the rate of gain was only slightly higher than during the third quarter and seemed to have stabilized. While available, data for the kindergarten are not reported here, first, because information is available for only two quarters, and, second, because unlike the first grade, the whole class was not in the basal reader program. For these same reasons, retention data and pretest correlations with end of the year reading achievement for the kindergarten are not presented.

Initial consonant learning

The very slow rate of learning during the first quarter was due largely to the difficulty with which initial consonant sounds were learned. An estimate of the amount of time required to learn the various initial consonants is shown in Table 2. The figures were derived by averaging the number of 20 minute classes during which each child received instruction on the objective before passing the posttest. Data were analyzed only for those

Table 2

Time Required for the Learning of Initial Consonants

Consonant	Mean Number Lessons
1. b	7.0952
2. d	5.7143
3. g	5.5238
4. p	3.0476
5. t	3.4762
6. /k/c	3.3333
7. k	2.9048
8. q	2.9048
9. h	3.4762
10. v	1.6190
11. s	2.8095
12. f	2.7143
13. z	2.9043
14. m	2.9524
15. n	3.4286
16. j	2.0476
17. l	3.0476
18. r	2.0000
19. y	2.2857
20. w	2.1905

(n=21)

21 first grade children who had learned all 20 consonants by the end of the school year.

According to a linguist at KEEP whose area of specialization is the

phonology of Hawaii Creole, all of the initial consonant sounds the children were taught do occur in Creole. Furthermore, on the basis of what is known about Creole phonology, there would be no reason to predict that any particular consonant would be more difficult to learn than any other. There was some acceleration of learning with the first four letters, indicating that the children seemed to have greater difficulty in learning the first phoneme-grapheme correspondences. After the fourth letter, however, this increase in rate of learning was not continued.

Table 3 shows the results of statistical tests to determine if a learning-to-learn trend was shown within the first four consonants. Comparisons were made between the number of days of instruction taken before the posttest was passed by each student. Significant differences were found when the first, second, and third letters were each compared to the fourth letter. Between the first and fourth letters, $\underline{A}$=.1106, $p<.001$; between the second and fourth, $\underline{A}$=.1193, $p<.01$; and between the third and fourth, $\underline{A}$=.1072, $p<.001$.

Table 3

Learning to Learn within the First Four Consonants

Letters	A	P
b(1) and d(2)	.7883	N. S.
b(1) and g(3)	.8310	N. S.
b(1) and p(4)	.1106	$p < .001$
d(2) and g(3)	13.6250	N. S.
d(2) and p(4)	.1193	$p < .01$
g(3) and p(4)	.1072	$p < .001$

(n=21)

Further analysis of the last 16 consonants showed that these were learned

after a mean of 2.76 lessons. The standard deviation for the number of lessons taken to learn these consonants was .555. The following table shows the four most slowly learned consonants for which the mean number of lessons required was more than one standard deviation above the mean.

Table 4

Consonants More Than One Standard Deviation Above Mean

Consonant	Number in Sequence	Z
t	5	1.2981
h	9	1.2981
n	15	1.2123
/k/ c	6	1.0405

N, which occurred fifteenth in the 20 letter sequence, proved to be as difficult to learn as t and /k/c, which were fifth and sixth in the sequence. In the case of /k/c, it is possible that the letter name siy suggesting a s sound caused some confusion for some children.

Consonants which were learned most quickly, with the mean number of lessons required more than one standard deviation below the mean, are shown below.

Table 5

Consonants More Than One Standard Deviation Below Mean

Consonant	Number in Sequence	Z
v	10	-2.0488
r	18	-1.3622
j	16	-1.2764
w	20	-1.0189

In this case, it might be guessed that r, j, and w were learned more quickly because they came near the end of the sequence. V, however, was learned most quickly of all and was only tenth in the sequence.

Data on consonant learning for the kindergarten were available for only ten children, the only ones who completed level one. This information is not reported at this time because of the small size and unrepresentative nature of this group.

Retention tests

Retention data for levels one and two were analyzed for the first graders (n=27). The mean number of subtests correct on the retention test for level one was 33.71 out of a possible 39, with a range from 28 to 39. For level two the mean was 24.13 out of a possible 26, with a range from 17 to 26. The restricted range in both cases accounts for the nonsignificant correlations between scores on the two retention tests and total reading achievement ($r=-.107$ for level one and $r=.134$ for level two).

Correlation of Pretest Scores with End of the Year Reading Achievement

Pretest data for the first grade class were analyzed for levels one, two, and three. The mean pretest score for level one was 6.39 out of a possible 39. The correlation of scores on this pretest with end of the year reading achievement, as measured by the total number of posttests passed, was significant ($r=.771$, $t=5.546$, $p<.001$, $n=23$). The mean pretest score for level two was .667 out of a possible 26. Because the test covered sight vocabulary and most children scored zero, no correlations were done. The mean pretest score for level three was 24.13 out of a possible 52, and the correlation with end of the year reading achievement was again significant ($r=.438$, $t=2.233$, $p<.05$, $n=23$).

Correlations of Reading Achievement with IQ and Standard English Competence

Table 6 shows the correlation between reading achievement at the beginning and end of the school year and IQ scores. For the first grade, beginning reading refers to test scores obtained in September, 1973, final reading to test scores obtained in June, 1974. First IQ refers to Wechsler Preschool and Primary Scale of Intelligence (WPPSI) scores obtained in the spring of 1973, second IQ to the Wechsler Scale of Intelligence for Children (WISC) scores obtained in the spring of 1974. For the kindergarten, beginning reading refers to test scores obtained in February, 1974. All other references are the same as for the first grade, except that the kindergarteners were tested both times with the WPPSI. All of the correlations

Table 6

Reading Achievement and IQ

	First Grade	Kindergarten
Beginning Reading/First IQ	.7458 (n=23)	.7712 (n=27)*
Beginning Reading/Second IQ	.5643 (n=23)	.6691 (n=27)
Final Reading/First IQ	.8821 (n=23)	.7787 (n=27)
Final Reading/Second IQ	.7634 (n=28)	.7077 (n=27)

*$p < .01$ in all cases

are highly significant ($p < .01$ in all cases). It is interesting to note with both classes that the highest correlations are between final reading and first IQ, .8821 for the first grade and .7787 for the kindergarten.

The Standard English Repetition Test (SERT) (see Technical Report 15) was administered to both kindergarten and first grade classes in the fall and spring. Correlations with beginning and final reading achievement are shown in the table. Again, all correlations are highly significant.

Table 7

Reading Achievement and SE Competence

	First Grade		Kindergarten	
	r	p	r	p
Beginning Reading/Fall SERT	.5071	p<.02	.561	p<.01
	(n=23)	t=2.6962	(n=26)	t=3.3196
Beginning Reading/Spring SERT	.6846	p<.001	.5743	p<.01
	(n=23)	t=4.3040	(n=27)	t=3.5078
Final Reading/Fall SERT	.6722	p<.001	.6499	p<.001
	(n=23)	t=4.1606	(n=26)	t=4.1892
Final Reading/Spring SERT	.6855	p<.001	.6358	p<.001
	(n=28)	t=4.8007	(n=27)	t=4.1189

Partial correlations between reading achievement and Standard English competence, if IQ is held constant, are presented in the following table.

Table 8

Correlation between Reading and SERT, IQ Constant

	First Grade	Kindergarten
Fall	r=12.3	r=12.3
	.0746	-.0106
	t=.3345	t=-.0530
	(n=23)	(n=26)
Spring	.3873	.2930
	t=2.0147, p<.10	t=1.5013
	(n=28)	(n=27)

Correlations are between scores obtained on all three variables during the

same time period, that is, "fall" indicates that correlations between fall scores in reading, IQ, and Standard English competence were used to arrive at the partial correlation. In no case was the relationship highly significant, indicating that reading achievement, at least in the early stages, is much more related to IQ than to Standard English competence. This conclusion is substantiated by the results of the partial correlations for reading and IQ, when Standard English competence is held constant. It can be seen that IQ

Table 9

Correlation between Reading and IQ, SERT Constant

	First Grade	Kindergarten
Fall	r=12.3	r=12.3
	.6371	.6398
	t=3.6976, p<.01	t=3.9925, p<.001
	(n=23)	(n=26)
Spring	.5749	.4838
	t=3.5131, p<.01	t=2.7082, p<.02
	(n=28)	(n=27)

correlations are not greatly reduced by factoring out the variability due to Standard English competence. All correlations between reading and IQ remain highly significant.

Standardized tests

Results obtained from administration of the Gates-MacGinite Reading Test, Primary A, for the KEEP first grade are shown in Table 10. School 1 is a middle class suburban school, School 2, an urban school in a disadvantaged area, and School 3, a Neighbor Island school in a rural Hawaiian community.

Table 10

Gates-MacGinitie Reading Test, Primary A, Scores

	KEEP	School 1	School 2	School 3
	n=28	n=35	n=34	n=12
Vocabulary				
Standard Score ($\bar{X}$)	34.50	51.71	33.50	40.08
Percentile	6	58	4.5	16
Grade Score	1.3-1.4	2.3	1.3	1.5
Standard Deviation	15.14	10.74	22.69	15.49
Comprehension				
Standard Score ($\bar{X}$)	37.25	50.60	37.91	40.50
Percentile	10	53	12	16
Grade Score	1.4	2.0	1.5	1.5
Standard Deviation	12.20	9.88	18.76	9.37
Composite (Voc. & Comp.)				
Standard Score ($\bar{X}$)	35.54	51.14	35.70	40.29
Percentile	7-8	54	7-8	16
Standard Deviation	10.81	10.41	18.07	11.68

Predictably, the highest mean scores on all three measures were obtained by the class at School 1, the middle class school. The scores for the KEEP class are most like the scores of School 2. However, while the vocabulary, comprehension, and composite mean standard scores are identical, the standard deviations for School 2 are much larger than for KEEP. The mean scores at School 3 are higher than those for KEEP and School 2, although the numbers of subjects at School 3 must be taken into consideration.

The distribution of composite scores appears in Table 11. All four schools show very different distributions. At KEEP, there were many students who scored below the 10th percentile and none who scored above the 70th. At School 1, as expected, scores approximated a normal distribution with both the mode and the median falling between the 51st and 60th percentiles. School 2 had the largest number of very low scores, below the 1st percentile,

but, there is a cluster of scores near the top end of the scale.

Table 11

Distribution of Composite Scores on Gates-MacGinitie Reading Test

Percentile	Number of children (% of class)			
	KEEP	School 1	School 2	School 3
	(n=28)	(n=35)	(n=34)	(n=12)
0	6(21.43)	0(0)	13(38.23)	1(8.33)
1-10	9(32.14)	3(8.57)	7(20.59)	3(25)
11-20	3(10.71)	4(11.43)	2(5.88)	5(41.67)
21-30	4(14.29)	3(8.57)	0(0)	0(0)
31-40	3(10.71	3(8.57)	2(5.88)	1(8.33)
41-50	0(0)	1(2.86)	1(2.94)	0(0)
51-60	2(7.14)	6(17.14)	2(5.88)	0(0)
61-70	1(3.57)	2(5.71)	0(0)	0(0)
71-80	0(0)	3(8.57)	1(2.94)	0(0)
81-90	0(0)	5(14.29)	3(8.82)	2(16.67)
91-100	0(0)	5(14.29)	3(8.82)	0(0)

Table 12 focuses on the performance at the lower end of the scale, showing the percentage of students in each class with scores at or below the 10th percentile. The total percentage of students scoring below the 10th percentile is very similar for KEEP and School 2. School 2, however, has a somewhat higher percentage of students scoring below the 1st percentile. School 1 shows few students with very low scores, while School 3 shows 33.33% of the class with scores in this range.

Table 12

Percent of Class at or below 10th Percentile

Percentile	KEEP	School 1	School 2	School 3
0	21.43	0	38.23	8.33
1-10	32.14	8.57	20.59	25.00
Total	53.57	8.57	58.82	33.33

The percent of the four classes scoring above the 50th percentile is shown in Table 13. KEEP shows the smallest percentage of children at this level, only 10.71, in contrast to the scores of children at School 1 where 60% of the class scored in this range, and School 2, where 26.47% scored in this range, and School 3, with 16.67% of the class in this range.

Table 13

Percent of Class above 50th Percentile

Percentile	KEEP	School 1	School 2	School 3
51-100	10.71	60.00	26.47	16.67

It must be noted that the results obtained are not completely comparable because of differences in the populations at the different schools. The test was administered at School 1 to have a local middle class comparison group, because the norms of the Gates test were developed from mainland samples. The particular class tested was selected because it was using the same basal reader program as KEEP, the Ginn 360. School 2 was chosen because it was in the same geographic area as the KEEP school and was thought to have a similar population. However, 19 of the 34 children who took the test appeared to have Filipino surnames, as compared to only 2 out 28 children in the KEEP class. Another difference between the two groups was in the number of children from families on welfare. At School 2, the figure was about 37% while at KEEP it

was 75%. Certain differences between the population at School 3 and KEEP should also be noted. Students at School 3 come from a rural area, and observers have described them as more obedient, quiet, and attentive than the KEEP students, who come from an urban environment.

The correlation between the Gates-MacGinitie scores and total reading achievement of the KEEP first grade class as measured by the total number of posttests passed was .8493 (t=8.2034, $p<.001$, n=28).

Discussion

The results of standardized tests administered at the end of the school year indicated that the KEEP first grade students were reading as a group at a grade level of 1.4 rather than the expected level of 1.9. Standardized testing verified the observation that there was a relatively slow rate of learning, as measured by the number of posttests passed. There was a very high correlation of .8493 between the reading achievement of the class, as measured by criterion-referenced tests, and the scores on the Gates-MacGinitie.

More than half of the KEEP class, 53.57%, scored below the 10th percentile on the Gates test, only 10.17% scored above the 50th percentile, and no children in the group ranked higher than the 70th percentile. The mean composite score was 35.54 which placed the group in the 7th to 8th percentile. The results of testing three other groups, two similar in some ways, were described. The middle class group using the same curriculum as the KEEP students showed the expected results, obtaining a mean composite score of 51.14 which placed them in the 54th percentile as a group. Students in a school in the same geographic area as the KEEP school, showed results almost identical to those at KEEP, with a mean composite score of 35.70, falling also in the 7th or 8th percentile. Differences in the distribution of scores between KEEP and this school were described. The percentage of students in both classes scoring below the 10th

percentile was very close, 53.57% at KEEP and 58.82% at School 2. At this end of the distribution, it was observed that a smaller percentage of students at KEEP were below the 1st percentile (21.43% to 38.23%) and a slightly larger percentage had scores between the 1st and 10th percentile (32.14% to 20.59%). This may indicate some differences in the progress being made by lower ability students.

It may thus be concluded from both criterion-referenced and standardized test results that the effects of good teaching and motivation in themselves were not enough to raise the students to grade level reading. This finding points to the need for a detailed investigation of curriculum variables which may be affecting the rate at which students in the subject population learn to read.

However, good teaching and motivation provided the framework within which learning could and did take place, as shown by the large number of reading skills gained by the first grade children during the school year. Pretests showed that they had mastered an average of only 6.39 skills at the beginning of the year, but by the end of the year, they had mastered 98.35 skills, for a mean gain of 91.96. There is no doubt that much learning did occur, yet the rate of learning was not rapid enough to bring the children to grade level in reading.

The analysis of data on the mean number of objectives gained per quarter showed that the first grade students' rate of learning new objectives increased as the year progressed. This learning-to-learn phenomenon shows that they were developing skills which enabled them to acquire other skills more quickly. During the first quarter they learned a mean of 10.1813 new objectives. This mean rose to 19.5417 in the second quarter, to 31.7083 in the third, and to 33.1667 in the fourth quarter. The rates of increase between the first and second, and the second and third quarters were significant

($p < .001$ in both cases). The question of how to accelerate this process even further during the first year of learning to read becomes an important one.

Much of the slow progress during the first and second quarters was due to the difficulty in learning initial consonant sounds. An analysis of data on initial consonant learning showed that the mean number of lessons required before the students passed a posttest on a given consonant did not decrease at a steady or constant rate over the series of 20 consonants which were to be learned. The steady acceleration of learning which occurred over the first four consonants might be accounted for in different ways. The first two consonants to be learned were b and d, and it is possible that the difficulty in discriminating between the two graphemes contributed to the slower rate at which these two were learned. On the other hand, it may be the case that there was a learning-to-learn effect in the beginning of the sequence of consonants.

On the basis of the observations of the reading teachers, it would appear that there was a great deal of later value in the learning of initial consonants, despite initial difficulties. Without having been specifically trained to do so, some of the children used their knowledge of initial consonant sounds to help them read unfamiliar words. Many of them also seemed to generalize from what they had learned about consonants in the initial position to consonants in the final position, and thus were able to pass tests on final consonants after fewer lessons, or even after no lessons at all. This use of information learned earlier accounted in part for the higher pretest scores in level three and also for the acceleration of learning seen in the third and fourth quarters of the school year.

One of the main reasons for interest in the acquisition of initial

consonants was the question of whether, and in what way, language patterns might interfere with learning to read. Most of the children at KEEP and in the subject population are speakers of Hawaii Creole, or "pidgin" English. The dialect in which they are learning to read, both in terms of their teachers' language and the language of their basal readers is "Standard" English. While these dialects have many, many common elements, there are also specific known points at which they differ. Some of these points have to do with phonology so that it might be expected that phonological differences could cause interference in those areas in which Hawaii Creole differs from Standard English. However, the data on initial consonant learning do not seem to support a theory of language interference at the phonological level. Rather, it seems there was a possible learning-to-learn effect with the first four letters, as mentioned earlier, followed by a plateau, at which time (with the possible exception of v) all letters were learned after about the same number of lessons. This would point to the possibility that it was not Standard English competence in itself that adversely affected the children's learning of initial consonants, but rather lack of skill in other areas of language competence or cognition. This interpretation is supported by the finding that there were not significant correlations between reading achievement and Standard English competence when IQ effects were held constant. Furthermore, when Standard English competence was held constant, the correlations between reading achievement and IQ remained very high.

It would seem at the present that the most fruitful area for future research would be that of language and cognitive learning. It may well be that certain kinds of language and cognitive training either preceding or included with formal reading instruction might greatly accelerate the acquisition of reading skills.

A start has already been made in inventigating some possible variables. One of those already tested was the hypothesis that lack of retention of previously learned skills might account for the relatively slow rate at which objectives were learned. This hypothesis was not supported since the analysis of retention data showed that few objectives were forgotten with the passage of two weeks of time. Furthermore, all students of both higher and lower ability performed equally well on the retention tests. One reason for good retention was undoubtedly the rigour of the criterion-referenced tests which were designed in such a manner that getting a perfect score by chance was extremely improbable. The high standard set for passing a test meant that students were trained until they had a relatively high level of competence in the skill and much over-learning occurred.

Another study of a possibly important language and cognitive skill has also been conducted at KEEP. In this study, children in the experimental group were trained to "label" or use phrases to describe the differences between similar letter-like forms. It was found that it was possible to train children in this specific skill. Also, a high correlation between this labelling skill and reading achievement was found. The findings of this study would seem to support the view that language and cognitive training would accelerate the acquisition of reading skills (see Technical Report #37).

Informal observations also point to the high potential in this area of research. Many observations were made in particular with the group of eight kindergarten children who were placed in a special prereading program rather than the basal reader program. The primary aim of this program was to develop attentional skills and a highly structured system for doing so was used (see Technical Report #34). The main idea behind this approach was that attentional skills should be treated as academic skills, basic to

all future learning in school. Training was also provided in three areas of language competence: 1) use of prepositions, 2) vocabulary, and 3) repetition of phrases. The success of training in attentional skills and these three areas of language competence seemed to be verified by the manner in which the children tackled the learning of sight vocabulary, introduced at the end of the semester.

The observed lack of previous training in basic attentional, linguistic, and cognitive skills, especially with children in the prereading program, suggests that a one year effort to reach grade level reading in the first grade would have to teach many children skills which most middle class children would have been taught over a period of perhaps three or four years. Follow up investigation should be done to see whether the later effects of this first year basal reader based program have served at all to narrow the gap between the KEEP students and their middle class peers.

At this point, a few remarks will be made to explain the reasons for using the approach to curriculum research which has been described. Within the area of reading research there is some controversy surrounding the use of programs in which many specific behavioral objectives are drawn up and then arranged in a set order. The basal reader program used here was obviously of this type. Opponents of this approach to the teaching of reading argue that a highly specific skills-oriented approach cannot be justified, because it is not yet known exactly what skills are required by most children in learning to read. Furthermore, it is pointed out that the types of skills used at one stage of reading may not be useful at another, later stage, and may even be a stumbling block to future learning in some cases. For example, the use of specific phonic (decoding or sounding out) skills may be very helpful to children who are beginning to learn to read. However, this latter

by letter sounding out strategy would be highly inefficient for mature readers, who read by whole words or phrases. These two points are important. However, in support of a specific skills-oriented approach to reading, it is maintained that the current lack of information about which skills will facilitate learning to read should not prevent investigation along this line or the use of sensible programs which seem to make use of what information is available. The regrettable lack of concrete evidence to support the value of many specific skills in the process of learning to read should serve as an impetus for future research, not as a barrier.

Furthermore, a specific skills approach has many advantages when compared to the global types of strategies often used in reading research. One extremely important advantage is that when a study is concluded it is generally possible to relate the differences between the data for experimental and control groups, if any, to specific factors. This is seldom possible when global strategies are used. For example, a study of the global type might compare a phonics curriculum to a so-called linguistic reading curriculum. Generally, the only measure of the dependent variable is the achievement test scores obtained at the beginning and end of the year. Reinforcement systems, motivation, teaching behaviors, and instruction in specific skills are neither carefully monitored nor controlled. The primary variables are not clearly defined, nor are secondary variables considered. While many other points on this subject could be made, it is merely the intent here to show that while global studies sometimes purport to have found the superior reading curriculum, the methodology used in many such studies casts doubt on their results and conclusions. Dramatic and wide ranging claims cannot be made for studies which test the effects of a few specific skills at a time. However, it is the opinion of the authors that more carefully controlled

studies of those specific skills will in the long run yield much more reliable information relating to the development of effective reading curricula.

Future Research

The most important area of investigation supported by much of the data earlier described is that of the relationship between specific language and cognitive skills and reading achievement. These variables need to be isolated and training in them attempted to see if reading achievement can be promoted. Language skills such as labelling seem highly related to reading, and it appears that training in this and other skills, such as those taught in the prereading program, can be very successful.

It would also seem relevant to examine more specifically the kinds of verbal intelligence skills that contribute the most to learning to read. While this area of investigation is supported by IQ correlations with reading, the IQ tests themselves do not provide adequate data on exactly what these skills are. Training procedures for such skills also need to be developed. The importance of attentional skills, for example, has been mentioned and specific training methods attempted.

Within the reading curriculum, initial consonant learning was shown to be an area which could very profitably be investigated. The need for precise data on trials to criterion, not available in the method by which data were collected this year, is recognized. Ways of accelerating learning in this area should be investigated, including such variables as grouping of items (whether similar items should be taught together or not), massed and distributed practice, individual instruction, and number of items to be learned at once. Other variables considered in verbal learning and paired associate learning studies may also be relevant.

Conclusion

The first year of formal investigation at KEEP into the beginning reading problems of Hawaiian and part-Hawaiian students produced the finding that curriculum variables should be investigated in detail and pointed to some specific ways in which research in this area might proceed. Although there was a continuing need to provide students with good teaching and motivation as the basis for all future learning, it was concluded that these elements in themselves were not sufficient to produce grade-level readers.

In order to accelerate learning, instruction in certain kinds of cognitive skills apparently needs to be built into reading programs for disadvantaged Hawaiian and part-Hawaiian students. These skills may not be recognized as reading skills in themselves, but when taught they may very well accelerate the whole process of learning to read.